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ABSTRACT

This study investigated problems related to the consistency of infants' reactions to different strangers and unfamiliar behavior. Eighty infants were studied in matched groups of eight boys and eight girls each at ages 4 1/2, 6 1/2, 8 1/2, 10 1/2, and 12 1/2 months. Three sets of measures of infants' reactions to strangers were collected from these sources: (1) interviews with mothers concerning their child's usual reaction to unfamiliar people, (2) laboratory observations of infant-stranger interactions, and (3) a follow-up questionnaire completed by the mothers. In the observation sessions, each infant was approached in a standardized manner by a male and female stranger, both while the baby was on the mother's lap and while he was at a feeding table four feet away from her. In each approach episode, the stranger systematically varied his behavior, moving from sitting silently across the room to picking up the infant. Results were analyzed and discussed in terms of differences between stranger episodes, consistency across stranger episodes, universality of fear of strangers, relationship between mothers' reports and direct observations, age trends, and stranger fear as a useful variable in developmental research. (DP)

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DETERMINANTS OF INFANTS' REACTIONS TO STRANGERS[1]

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One of the earliest observations of infant development was that in the second half of the first year of life some babies react negatively to unfamiliar people. Although there have been a number of studies of this fear of strangers phenomenon (see reviews in Bronson, 1968 and Zegans and Zegans, 1972), there are still many unresolved questions. This paper focuses on problems related to the consistency of infants' reactions to different strangers and stranger approaches, at different times, and measured different ways. Since it is clear that there is considerable variability from one condition to the next, this paper also looks at whether such differences systematically vary with the condition.

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Method

Subjects. Eighty infants, eight boys and eight girls each at 4½, 6½, 8½, 10½, and 12½ months of age, were selected as subjects. The five age groups were approximately matched on father's education and exposure to people. The design of the study is summarized in Table 1 and described below.

Insert Table 1 about here

Interview. Each mother was interviewed in her home at a time when her infant was asleep. In addition to a number of questions about her infant's temperament and experiences, the mother was asked how her baby currently reacted to unfamiliar people. The answers to this question were coded on a five point scale from markedly positive (i.e., usually smiles, gurgles, and/or reaches toward strangers) to markedly negative (i.e., usually quite cautious and sometimes cries or fusses). The mother was also asked if her infant had ever been upset by a stranger, how frequently, and at what age(s).

Laboratory observations. A few days after the interview each mother came to the laboratory for a systematic observation of her infant's reactions to strangers in an unfamiliar, but comfortably furnished room. The infant was approached in a standardized manner by a male and a female stranger, both while on the mother's lap and while in a feeding table, four feet away from her. These four approach episodes were balanced so that order effects could be estimated and controlled. Each approach episode consisted of four consecutive, ten-second intervals during which the stranger's behavior was varied systematically. The stranger first sat silently across the room, then spoke to the infant, then moved up close and finally touched the baby's hand. In addition to these approach and touch episodes, each infant was tested in a "peek-a-boo" type situation by the male stranger and was picked up by each stranger. A more complete

outline of the procedure and design is provided in Table 1.

Very detailed coded observations of the infant's behavior toward the strangers were made. Table 2 shows the various categories of behavior and how they were weighted and combined to form the scores used in this

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Insert Table 2 about here
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report. Considerable detail about the scoring is provided because it is felt much of the confusion and misunderstanding in this area has resulted from differences in the observational techniques. It is important to note that with the scoring used in this paper, stranger fear (negative reactions) were more likely to be reported than with some techniques which have been used and less likely than with others. For example, cessation of smiling and/or activity were not scored as negative reactions as they sometimes have been (e.g. Scarr & Salapatek , 1970). On the other hand, avoiding the stranger's touch or gaze, not just crying or fussing, were scored as negative.

Follow-up questionnaire. Three to five months later, sixty-two mothers (78%) responded to a brief mail questionnaire about their infants' then current reactions to strangers and how they differed from the infants' reactions around the time of the interview and observation session.

Thus, three sets of measures of reactions to strangers were available for most infants: a) mother's interview report; b) observations in the controlled laboratory situation within a few days after the interview; and c) mother's report four months later.

Results and Discussion

Differences Between Stranger Episodes

Table 3 provides comparative information about the infant's reactions during the several stranger episodes or situations in the laboratory. Two main findings should be noted. First, the overall percentage of infants reacting negatively increased significantly with age[2]. Second, for the older infants the five types of episodes differ systematically in terms of stressfulness[3].

Insert Table 3 about here

Examining Table 3 more closely, it can be seen that very few of the younger infants reacted negatively in any situation. Furthermore, few babies of any age were negative when the stranger first entered and sat down about six feet from them.

Likewise, only a small percentage reacted negatively in the peek-a-boo type situation in which the male stranger moved his head and torso up and down from in front of them to below the shelf of the feeding table in which they were seated. The peek-a-boo situation was much less frequently fear producing for the older infants than the male approach while in-the-feeding-table episode which always preceded it. The fact that almost all the infants reacted positively in the peek-a-boo situation, even though the stranger was within two feet of them, indicates that neither proximity nor unfamiliarity are fear producing by themselves.

Like proximity, touching did not necessarily elicit a high proportion of fussing, crying or pulling back. However, when the older

infants were physically contacted by the stranger, and not in contact with their mothers, they were likely to react negatively. Bronson (1972) has also reported fewer negative reactions when the infant was on mother's lap than when he was several feet away on the floor. However, Bronson found little crying in his oldest infants (9 months) even when they were approached while on the floor, probably because they were free to crawl away from the stranger to their mother. In the present study it may be speculated that the feeding table and the holding situations have in common the possibility of generating in the older infants the feeling that they are trapped away from the mother by a person whose approach they did not initiate or encourage.

Many investigators have observed that infants are most likely to cry when the stranger touches or picks them up. However, these procedures have usually occurred only at the end of a single, gradual approach episode so it has not been possible to separate the cumulative effects of the sequence from the effects of the component steps. In this study it is possible to have some confidence that reactions to the different types of episode were not highly influenced by order effects. Each of the episodes shown in Table 3 was separated from the others by a time-out period during which the mother could talk to and, if necessary, calm the baby. Furthermore, the order of the episodes was partially balanced in the design, and an analysis of the reactions to the same type of episode in different places in the design did not reveal any consistent order effects.

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To summarize this section, there were significant differences in the negative potency of the situations. The data seem to indicate that fear of strangers is not based primarily on novelty or strangeness, nor even on the proximity of the stranger, but rather on whether the stranger acts as an "intrusive interloper"; i.e., one who inserts himself between the mother and infant without invitation.[4]

Consistency Across Stranger Episodes

Even though there were significant differences between several of the types of stranger episode, there was on the other hand considerable consistency between episodes. Table 4 shows not only that almost all

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Insert Table 4 about here
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the correlations were significant, but also that there were patterns in the degree of association. In general, the correlations were higher among the four most stressful episodes ($\bar{r}$=.53) than among the peek-a-boo and lap episodes ($\bar{r}$=.36) or between the more and less stressful episodes ($\bar{r}$=.36). Perhaps most interesting, the reactions of the infants to the same type of episode done by the two different strangers were somewhat more consistent ($\bar{r}$=.56) than the reactions to the same stranger in different episodes ($\bar{r}$=.42). The correlation between the sums of the several episodes for each stranger was .70 which is much higher than any of the within stranger correlations.

Robson, Pedersen & Moss (1969) found an average intrasession correlation of .65 between reactions to the same type of approach (one that included picking up the infant) by the same stranger at the beginning and

end of an hour interview-observation session in the home. Since the present study did not have repeated identical approaches by the same stranger, a direct comparison can not be made. However, the .63 correlation between the reactions to the two pick up episodes (one by each stranger) indicates that even with different strangers the same type of approach will produce quite consistent reactions.

Looking at somewhat similar data in another way, Shaffran & Decarie (1973), who had three different strangers approach the same infants (who were next to mother) on three separate but closely spaced days, found less than 50% exact agreement in type of response (+, -, or indeterminant) over the three days, with consistency mainly for the infants who reacted positively. This type of analysis of the present data gave similar results (i.e., 50% agreement) for the approaches of the two strangers with the infants on mothers' laps. However, in the more stressful away-from-mother situation, there were 60% exact agreements. Furthermore, the percentage of infants who were consistently negative rose from 21% for the lap-lap comparison to 50% for the two feeding table approaches.

The Universality of Fear of Strangers

Table 5 shows that although the percentage of infants who reacted generally negatively in at least one of the six approach or holding episodes increased sharply with age (from 13% at 4½ months to 94% at 12½ months), the

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Insert Table 5 about here

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percentage who reacted generally positively in at least one of these episodes remained very high at all ages. These results are provocative because they provide some support for both of two apparently conflicting positions. On the one hand, it can be argued (in agreement with, for example, Yarrow, 1967 and Rheingold & Eckerman, 1971) that fear of strangers is not a universal developmental landmark because positive episodes were more frequent than negative in almost all age groups and situations.

On the other hand, two thirds of the 10-month and all but one of the sixteen 12-month infants were clearly negative in their reaction toward the strangers in at least one of the six approach or holding situations. This high proportion is in agreement with several longitudinal studies which have found that almost all the infants showed fear of strangers sometime before a year (e.g., Tennes & Lampl, 1964; Schaffer, 1966).

The mothers' reports also indicate that the question of universality depends on what aspect of the data you look at. When asked how frequently in the previous few weeks their infant had fussed, cried or pulled back when approached by a stranger, only a small percentage of mothers of infants of any age said "often" or "always". On the other hand, Table 5 also shows that even by 4½ months a substantial proportion of infants were reported to have at least once reacted negatively to an unfamiliar person, and this proportion, reporting at least occasional negative reactions, rose to three quarters or more for each group 6½ months of age or older.

A similar point which needs re-emphasizing is that the unit and weighting of the response measures will significantly influence the interpretation of questions about the frequency of fear of strangers. That is, if one accepts sobering as an indication of fear (e.g., Scarr &

Salapatek, 1970) one would expect to see much more of it than if one demands crying or fussing (e.g., Rheingold & Eckerman, 1971).[5]

In summarizing this section, it seems that a number of factors influence whether one perceives fear of strangers to be a typical or atypical reaction of infants in the last half of the first year. The most important are probably the testing situation and the behavior of the stranger. A loud and rapidly intruding person in an unfamiliar setting will be likely to elicit a high proportion of negative reactions. On the other hand, a tester who approaches and waits for the infant to initiate the interaction, or one who at least postpones physical contact until the infant is involved with him, will be much less likely to evoke negative reactions. Also, repeated tests or a longitudinal design are more likely to pick up some negative episodes. Finally, differences in the types of responses one accepts as indicating fear or negative reactions will lead to different conclusions.

Relationships Between Mother's Reports and Observations

There was a significant correlation ($r=.51$) between the mothers' interview reports of their infants' current reaction to strangers and the observed overall stranger reaction in the laboratory a few days later. This correspondence provides some corroboration of the ecological validity of the lab situation and support for the usefulness of the mothers' reports of this type of behavior. Considering the variability in response between stranger episodes and the presumed differences between infants in the intrusiveness of strangers they had encountered, this correlation was felt to be quite high.

Although there was a relatively high relationship between interview and observational measures taken at about the same point in time, there was little consistency in stranger reaction over a four-month period. The mothers' follow-up questionnaire reports of their infants' then current reactions to strangers (four months after the interview) correlated only marginally with their interview reports ($r=.25$, $p<.05$) and with the laboratory reactions ($r=.25$, $p<.05$). It is felt that these relatively low correlations over time were due not only to the situation specificity of the reaction, but also to its generally phase-like nature. This interpretation is in agreement with several longitudinal studies (e.g., Tennes & Lampl, 1964; Schaffer, 1966) and with mothers' reports from this study which indicate that most infants have a period or phase, often less than three months in length, during which they are most easily upset by strangers. The correlation coefficients are also in line with some previous studies. For example, Robson, Pedersen & Moss (1969) found a correlation of .69 over a 1½ month period (8-9½ months of age); Scarr & Salapetek (1970) found an r of .43 over a two month period; and Bronson (1972) found an r of only .32 over the 2½ months period from 6½ to 9 months of age. The present study's correlations of .22 and .25 over four months seem to fit the above pattern.

Age Trends

Longitudinal data about the frequency of negative reactions to strangers were provided by mothers' reports at the interview and about four months later on the follow-up questionnaire. These results are shown in

Table 6. As expected, a larger proportion of cohorts 1 and 2 (who were initially 4 and 6 months old) reacted negatively four months later.

Insert Table 6 about here

There was no consistent directional change in the reactions of the 8 and 10-month infants who were followed up; but, in the oldest cohort, there was evidence of a reversal, with a significantly smaller percentage of the infants who were initially 12 months old reacting negatively at 16 months. These findings should be interpreted cautiously because there was little difference at the time of the follow-up between any of the age cohorts, in terms of the percentage of infants reported to react negatively to strangers. The reversal between 12 and 16 months is only a relative one, based on the initially high percentage of negative responses in cohort 5. It is possible that the infants in that cohort may have been at least initially, more sensitive to strangers than the sample as a whole.

There has been considerable disagreement in the literature about age trends in reactions to strangers. The reported differences in reaction are probably more related to differences in experimental procedures, scoring, and data presentation than to basic differences between studies in infants' reactions to strangers. Spitz' (1950) descriptive study and term "eight-months' anxiety" had a considerable impact on textbook discussions of the age trends in fear of strangers. The bulk of the empirical evidence now indicates that there is nothing special about eight months except that, if followed longitudinally, most infants will

have shown some negative reactions to strangers by that age. In fact, almost all the recent studies for which such comparisons can be made indicate that negative reactions are more intense at 12 months or later than around 8 months (e.g., Morgan & Ricciuti, 1969; Scarr & Salapatek, 1970; Lewis & Brooks-Gunn, 1972; Goulet & Decarie, 1973)[6]. However, such age comparisons should be interpreted cautiously and may not be very meaningful given the changing nature of the infant's response capabilities and of suitable testing situations.

Fear of Strangers as an Outcome or Predictor Variable

Unfortunately, at the present time there have been only a few scattered empirical reports of relationships between measures of fear of strangers and antecedent temperament or experience variables (see Bronson, 1972; Moss, Robson & Pedersen, 1969; Morgan & Ricciuti, 1969; Robson, Pedersen & Moss, 1969; Scarr & Salapatek, 1970). There have been even fewer studies in which fear of strangers has been found to be predictive of later personality differences (see Bronson, 1970). Furthermore, even in these studies, the significant correlations have usually been considerably outnumbered by the non-significant ones; and there seem to be few consistent patterns of findings within or especially across the studies.

The conclusion that fear of strangers has not yet been very useful as either an outcome or predictor variable is probably due to several factors, including inappropriate antecedent and consequent variables and the use of overly simplistic models. However, before one can expect to find relationships, it is necessary to satisfactorily measure fear of

strangers. It is proposed that in order to get a valid and reliable score the infants should be tested several times, preferably over a span of time, by several strangers, and with several different types of episodes, including some in which the stranger is quite intrusive.[7]

Summary and Conclusions

1. There were marked systematic differences in the percentage of infants reacting negatively in the several different stranger reaction episodes. A key factor in determining the stressfulness of the situation appeared to be the intrusiveness of the stranger's behavior; that is, the extent to which he thrust himself into contact with the infant while removing the infant from contact with the mother or appearing to prevent such mother-infant contact. Strangeness, proximity and even touching per se seem to be less important factors.

2. There was also considerable consistency in an infant's response across episodes, especially when the same type of episode was done by the two strangers at different times within the experimental session.

3. Whether one considers the fear of strangers phenomenon to be a universal developmental landmark or not depends on the type of stranger encounter and the frequency and intensity of reaction one includes. The present data indicate that almost all infants show at least occasional instances of at least avoidance of contact with strangers sometime in the latter half of the first year of life.

4. There was a relatively high correlation between mothers' reports of their infants' usual reactions to strangers and the observed

reactions in the laboratory.

5. A given infant's reaction to strangers changed considerably over a four month period leading to only minimal consistency in response across such a time span.

6. The probability of negative reactions to strangers appears to increase from 4½ through at least 13 months, but age trends, like the question of the universality of the reaction, depend a great deal on the situation and the responses measures.

In conclusion, stranger fear is a dramatic, if not universal, fact of infant development. There do seem to be marked and real individual differences in reactions to unfamiliar people and situations, not only in infancy, but throughout the life span. Therefore, it seems that if the methodological and conceptual issues can be worked out, individual differences in stranger reaction may become a useful measure of infant personality. The present paper has been an attempt to clarify some of these methodological issues.

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Footnotes

[1] This is a revised and expanded version of a paper presented at che biennial meeting of the Society for Research in Child Development, Philadelphia, March 29-April 1, 1973. The present paper is based on data collected by Morgan in 1964 and partially reported in Morgan and Ricciuti (1969).

[2] Chi Square equals 34.1 (df=4, $p<.001$) for the number of Ss of each age who reacted negatively in at least one approach and touch or pick up episode. The results of an analysis of variance on the summed affect scores (Morgan & Ricciuti, 1969) also indicated that there was a highly significant linear drop in the mean score from 4½ to 12½ months of age.

[3] The results with regard to differences between episodes are complicated by differences in reactions to the male and female stranger. When looking at the summed affect scores, there was a significant preference for the female , but no significant interactions between type of episode and type of stranger were found. H wever, when the data were analyzed in terms of the numbers of infants reacting negatively, the male-female difference was significant only in the feeding table episodes and, more importantly, the differences between episodes were, in several cases, attributable to differences for one of the strangers. For example, the "lap" versus "feeding table" difference was significant only for the male stranger, while the "lap" versus "at a distance" difference was significant only for the female stranger. These apparent interactions between type of stranger and type of episode are felt to be due in large part to the small numbers of infants changing their reaction from negative to positive (or vice versa) from one episode to another and, thus, the insensitivity of the statistic.

[4] A few comments on sex differences may be of interest. There were no differences, overall, in the reactions of boy and girl infants; both boys and girls preferred the female stranger; and there was not a significant interaction between sex of infant and sex of stranger. There have now been at least three studies which have reported less intense negative reactions to a female than a male stranger (Morgan & Ricciuti, 1969; Lewis & Brooks-Gunn, 1972; Shaffran & Decarie, 1973). In fact, Shaffran & Decarie found each of two female strangers less fear producing than a male stranger. Finally, there is some suggestive evidence to support Lewis and Brook-Gunn's notion that physical size may be an important determinant of the infant's reaction. They found very few negative reactions to a four year old child. In the present study the female stranger was quite small, only about five feet tall, while the male was about six feet tall.

[5] In general, the descriptive phrase "negative reactions" has been used in this paper in place of "fear" or "anxiety". This was done because the latter terms were felt to have too much surplus meaning. "Fear of strangers" seems to put the emphasis on the unfamiliar identity of the person, while the present data indicate that what is done by the person is at least as important as who he is. To avoid undue repetition and when referring to other investigators, "fear of strangers" was sometimes substituted for "negative reactions". Unfortunately, this may occasionally leave the impression that the negative reactions were all quite intense when, in fact, there was almost always a range. For example, the reactions of the 12-month infants to one of the most stressful episodes (the male stranger's approach and touch while the infant was away from mother in the feeding table) were distributed as follows:

Unambiguously positive (smile and reach toward)	2
Mild ambivalence (brightens&/or touches stranger's hand but also avoids glance &/or avoids touch)	4
Mildly negative (gaze aversion, frown,&/or touch avoidance)	2
Moderately negative (some fussing plus frown &/or avoidance)	5
Very negative (some crying plus other negative reactions)	3

One might be tempted to say that only 3 (or perhaps 8) infants showed fear, even though a total of 14 showed wariness or caution (some negative behaviors). In this paper, only the three lower groups (n=10) were considered to have reacted generally negatively to the episode. The balance between the positive and negative responses of the ambivalent infants was such that they were not considered to have reacted negatively to the episode. (Incidentally, such ambiv[illegible]reactions were much more common in the older infants.)

It is clear that there is a good deal of room for disagreement about the categorizing and labeling of infants' reactions to strangers. Although it makes analysis and data presentation very complex it seems that we will have to be more detailed in reporting data (or more consistent in categorizing) if we are ever to be able to compare one study with another.

[6] Only a very few recent studies of stranger reaction have actually reported a peak and then a decline, before a year of age, in the frequency and/or intensity of negative reactions to strangers, and these studies have methodological and reporting weaknesses which make their age trend conclusion questionable. Spitz (1950) does not report his procedures or data except in very general terms. For example, his statement about age trends appears in a single sentence, undocumented by any numbers. He then added a point which is seldom cited, "only to reappear, generally much stronger, towards the end of the second year." Can one be confident that the apparent dip was not an artifact? Tennes and Lampl (1964), as part of a study whose purpose was to distinguish between stranger anxiety and

separation anxiety, report an early peak (at 7-9 months) for the former; however, they report in the text that the table labeled "Intensity Peaks" is really the age at the "highest rating or the first occurance of the highest rating" for each subject. This type of presentation makes their data difficult to interpret.

Several other studies which sometimes have been cited as indicating a peak in negative reactions before a year did not, in fact, present data which indicated a decline. For example, Schaffer's (1966) data indicate only that the onset of fear usually takes place by eight months; he does not present data which indicate a decline by 12 months. Several other investigators have reported that their eight or nine month old infants were the most upset by a stranger, but they did not report data on infants older than that "peak" age (e.g., Yarrow, 1967; Bronson, 1972).

[7]The use of a single stranger episode on a single day is somewhat analogous to a one item personality test. Almost all the studies cited above which have found some significant relationships have used combined reactions to more than one stranger approach. In the present study, the correlations with mothers' reports of current stranger reaction were higher for the combined reaction to all seven stranger approach episodes than to any one alone. Also, the stability of negative responses was higher between the more stressful episodes, and the correlations between them and mother's reports were higher than for the less stressful episodes. Although one runs the risk of missing the most sensitive period for some infants, it might be acceptable to compress several tests into a single extended session at about a year of age. To obtain a more complete picture, measures of the age of the onset and the duration of any highly sensitive period(s) should also be secured. Without frequent longitudinal measurements starting at a very early age, mothers' reports would probably have to suffice for indices of onset and duration.

Table 1

Schematic Design of the Study

Overall Design

	Mother report from home interview		Direct observation in laboratory		Mother report on follow-up questionnaire	
Cohort	N	Mean Age	N	Mean Age	N	Mean Age
1	16	4½ mo.	16	4½ mo.	11	8½ mo.
2	16	6½ mo.	16	6½ mo.	10	10 mo.
3	16	8½ mo.	16	8½ mo.	15	12½ mo.
4	16	10½ mo.	16	10½ mo.	13	14½ mo.
5	16	12½ mo.	16	12½ mo.	13	16 mo.

Design of the Laboratory Session[a]

Order 1	Order 2	Order 3	Order 4
Male, Enter, Lap	M, Enter, Lap	F, Enter, Lap	F, Enter, Lap
Male, A+T, FdT	M, A+T, Lap	F, A+T, FdT	F, A+T, Lap
Male, PaB, FdT			
Male, A+T, Lap	M, A+T, FdT	F, A+T, Lap	F, A+T, FdT
	M, PaB, FdT		
Male, Pick up	M, Pick up	F, Pick up	F, Pick up
Female, Enter, FdT	F, Enter Lap	M, Enter, FdT	M, Enter, Lap
Female, A+T, FdT	F, A+T, Lap	M, A+T, FdT	M, A+T, Lap
		M, PaB, FdT	
Female, A+T, Lap	F, A+T, FdT	M, A+T, Lap	M, A+T, FdT
			M, PaB, FdT
Female, Pick up	F, Pick up	M, Pick up	M, Pick up

[a] Four subjects from each cohort (2 boys and 2 girls) were tested in each of the four orders. Under each order is listed the stranger's sex (M or F), the stranger's behavior (A+T is approach and touch, PaB is peek-a-boo) and the infant's location with respect to mother (FdT stands for in the feeding table, four feet away from mother).

Table 2

Observational Categories Used for Recording the Infants' Behavior

Facial Expression Scale

+2	Broad, clear smile
+1	Brief or slight smile, brightening
0	Any relatively neutral (sober) facial expression
-1	Slight frown, pout, or wrinkling of the face
-2	Marked and pronounced puckering or wrinkling

Vocalization Scale

+2	Laugh or giggle
+1	Other clearly positive sounds, coo, babble, etc.
V	Any vocalization that is not clearly positive or negative (0)
-1	Fuss, whimper, etc.
-2	Cry or scream
N	No vocalization (0)

Visual and Gross Motor Activity

R	Reaches for E or tries to approach E (+2)
T	Touches E's hand when it is put nearby (+1)
G+	Makes gross movements (waves arms, etc.) while looking at E with positive expression or vocalization (+1)
L	Looks at E (0)
I	Inattention to E and environment, squirming, sleeping (0)
S	Explores the surroundings (other than E) visually and/or tactually (0)
M	Looks at mother (0)
M-	Turns to and tries to get to mother (-1)
G-	Makes gross movements while looking at E with negative expression or vocalization (-1)
A	Avoids E's glance, turns away or looks down (-1)
P	Pulls hand back when E approaches (-1)
W	Attempts to withdraw or escape from E (-2)

Note. -- One behavioral category from each scale was tape recorded (using the codes in the left hand column) every 3 1/3 seconds. The table also provides the numerical weights which, when summed across an episode and divided by seven, produced a reliably measured (r=.95) score of the infant's affective reaction to an episode. The correlations reported in the results used these scores directly. Other data are in the form of percentages of infants reacting generally negatively during a given episode. An infant was judged to have reacted negatively in an episode if the sum of his weighted behaviors was more negative than -3 , i.e., would round to at least -1 when divided by seven. The above treatment eliminated some of the subtlety of the raw data, but preserved the general affective tenor of the reactions.

Table 3

Percentage of Infants Reacting Negatively to Strangers
In Several Types of Laboratory Episodes

Stranger Episode	Average Age in Months				
	4½	6½	8½	10½	12½
A. Enter and sit at distance	0	0	0	6	13
B. Near, peek-a-boo	0	6	19	7	21
C. Approach & touch, baby on mother's lap	0	6	6	31	50
D. Approach & Touch, baby 4' from mother	0	6	19	50	69
E. Pick up & hold	13	6	13	56	81

Note.--Each episode (except the peek-a-boo which was done only by the male stranger) was done twice, once by each stranger. The data in the table are percentages of infants reacting negatively to either or both of the strangers in the specified episode. The binomial test (Siegel 1956, p.66 ff) was used to judge the significance of the direction of changes in infants' reactions from one type of episode to another. At the $p \leq .05$ level, A<C<D=E; A=B<D=E; and B=C.

Table 4

Intercorrelations of the Infants' Affect Scores in the Seven Stranger-Near Episodes

	Less Stressful		More Stressful			
	Female A+T Lap	Male A+T Lap	Female A+T FdT	Male A+T FdT	Female pickup + hold	Male pickup + hold
M, PaB, FdT	.24	.46	.41	.32	.05	.34
F, A+T, Lap		.35	.44	.49	.36	.22
M, A+T, Lap			.32	.44	.35	.50
F, A+T, FdT				.66	.39	.40
M, A+T, FdT					.56	.51
F, Pickup + hold						.63

Note.--The episode is identified by the stranger's sex (M or F). The stranger's behavior(PaB is peek-a-boo, A+T is approach and touch), and the infant's location with respect to mother (FdT is the feeding table).

* When $r \geq .22$, $p < .05$ and when $r \geq .28$, $p < .01$ (two tailed tests).

Table 5

Comparison of Laboratory Observations of Infants' Reactions to Strangers with Mothers' Reports of Their Infants' Current Reactions (Percentage of group, N=16, responding in specified way)

	Average Age in Months				
	4½	6½	8½	10½	12½
Laboratory Observations					
Positive in at least one approach and touching episode	100	100	100	93	81
Negative in at least one approach and touching episode	13	13	31	69	94
Mothers' Reports					
Currently "often" or "always" negative to strangers[a]	6	6	6	6	25
At least one instance of a negative reaction to stranger	38	75	81	75	94

[a] Two more infants in the 8½-month old group and one more in the 12½-month group were reported to have passed through a stage when they were usually upset by strangers. Several more infants at each of the four older ages were reported to have been negative to strangers on "several" recent occasions.

Table 6

Longitudinal Data from Mothers' Interview Reports and Follow-up Questionnaire Reports about the Same Infants Four Months Later

Cohort	N	Average Age of Infants	Interview Report Percent Negative	Follow-up Questionnaire Percent Negative	Change in Percent Reacting Negatively
1	11	4½ mos. 8½ mos.	9	54	45*
2	10	6½ mos. 10 mos.	20	60	40*
3	15	8½ mos. 12½ mos.	40	47	7
4	13	10½ mos. 14½ mos.	31	38	7
5	13	12½ mos. 16 mos.	93	46	-47*

*Using the binomial test for the significance of the changes from interview to follow-up, p=.002 for cohorts 1 and 2 combined and p=.016 for cohort 5 (Siegel 1956, p. 66ff).